



Test Report

Product Name	Wireless Gateway
Model No	WG-110
FCC ID.	XBTWG-110

Applicant	United Integrated Services Co.,Ltd
Address	5F NO 3 LANE 7 PAOKAO ROAD HSINTIEN 23144 TAIPEI HSIEN TAIWAN

Date of Receipt	Feb. 18, 2009
Issue Date	Jun. 17, 2009
Report No.	092207R-RFUSP05V01-A
Report Version	V1.0

The test results relate only to the samples tested.

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Test Report Certification

Issue Date: Jun. 17, 2009

Report No.: 092207R-RFUSP05V01-A



Accredited by NIST (NVLAP)
NVLAP Lab Code: 200533-0

Product Name	Wireless Gateway
Applicant	United Integrated Services Co.,Ltd
Address	5F NO 3 LANE 7 PAOKAO ROAD HSINTIEN 23144 TAIPEI HSIEN TAIWAN
Manufacturer	United Integrated Services Co.,Ltd
Model No.	WG-110
Rated Voltage	AC 120V/60Hz
Working Voltage	AC 100-240V~47-63Hz
Trade Name	UIS
Applicable Standard	FCC CFR Title 47 Part 15 Subpart C: 2008 ANSI C63.4: 2003
Test Result	Complied



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Approved By : Vincent Lin
(Manager / Vincent Lin)



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1. GENERAL INFORMATION

1.1. EUT Description

Product Name	Wireless Gateway
Trade Name	UIS
Model No.	WG-110
FCC ID.	XBTWG-110
Frequency Range	2405-2480MHz
Number of Channels	16
Data Speed	Up to 200kHz
Type of Modulation	OQPSK
Antenna Type	Dipole Antenna
Antenna Gain	Refer to the table "Antenna List"
Channel Control	Auto
Power Adapter	MFR: ADAPTER TECH, M/N:STD-12020U Input: AC 100-240V,47-63Hz,0.58A Output: DC 12V,2A Cable Out: Non-Shielded,1.8m

Antenna List

No.	Manufacturer	Part No.	Antenna Type	Peak Gain
1	KINSUN	6602803081	Dipole	2.33dBi in 2.4 GHz

Center Frequency of Each Channel:

Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
Channel 01:	2405 MHz	Channel 02:	2410 MHz	Channel 03:	2415 MHz	Channel 04:	2420 MHz
Channel 05:	2425 MHz	Channel 06:	2430MHz	Channel 07:	2435 MHz	Channel 08:	2440 MHz
Channel 09:	2445 MHz	Channel 10:	2450MHz	Channel 11:	2455 MHz	Channel 12:	2460 MHz
Channel 13::	2465 MHz	Channel 14:	2470MHz	Channel 15:	2475 MHz	Channel 16:	2480 MHz

Note:

1. The EUT is a Wireless Gateway , Contains functions and so on WiFi 、 Zigbee, this report for Zigbee.
2. Regarding to the operation frequency, the lowest, middle and highest frequency are selected to perform the test.
3. These tests are conducted on a sample for the purpose of demonstrating compliance of Zigbee transmitter with Part 15 Subpart C Paragraph 15.247 of spread spectrum devices
4. The radiation measurements are performed in X, Y, Z axis positioning. Only the worst case is shown in the report.

1.2. Operational Description

The EUT is a Wireless Gateway, Contains Zigbee Transmitter. The Number of the channels is 16 in 2405~2480MHz, The device adapts the OQPSK modulation, The Antenna is Dipole Antenna.

Test Mode:	Mode 1: Transmitter (Zigbee)
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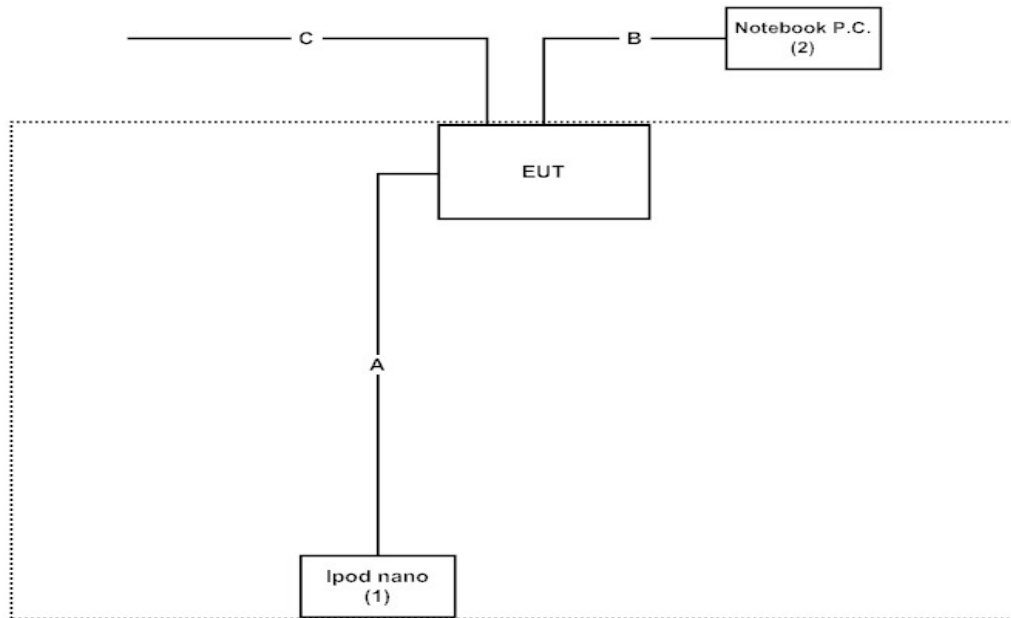
1.3. Tested System Details

The types for all equipment, plus descriptions of all cables used in the tested system (including inserted cards) are:

	Product	Manufacturer	Model No.	Serial No.	Power Cord
(1)	Ipod nano	Apple	A1236	YM823SWSY0P	N/A
(2)	Notebook P.C.	DELL	PP04X	C8YYM1S	Non-Shielded, 0.8m

Signal Cable Type	Signal cable Description
A	USB Cable Shielded, 1.5m
B	LAN Cable Non-Shielded, 7m
C	LAN Cable Non-Shielded, 7m

1.4. Configuration of Tested System



1.5. EUT Exercise Software

(1)	Setup the EUT as shown in section 1.4
(2)	Turns on the power source then continually to transmit.
(3)	Verify that the EUT works properly.

1.6. Test Facility

Ambient conditions in the laboratory:

Items	Required (IEC 68-1)	Actual
Temperature (°C)	15-35	20-35
Humidity (%RH)	25-75	50-65
Barometric pressure (mbar)	860-1060	950-1000

The related certificate for our laboratories about the test site and management system can be downloaded from Quietek Corporation’s Web Site : <http://tw.quietek.com/modules/myalbum/>
 The address and introduction of Quietek Corporation’s laboratories can be founded in our Web site : <http://www.quietek.com/>

Site Description: File on
 Federal Communications Commission
 FCC Engineering Laboratory
 7435 Oakland Mills Road
 Columbia, MD 21046
 Registration Number: 92195



Accreditation on NVLAP
 NVLAP Lab Code: 200533-0



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FCC Accreditation Number: TW1014



2. Conducted Emission

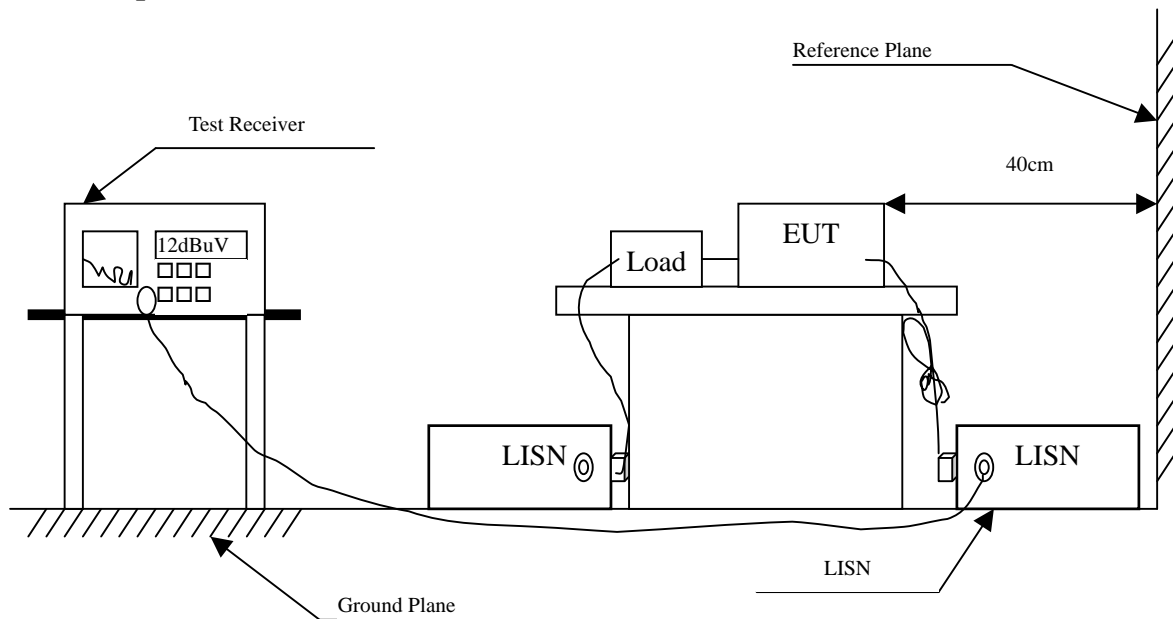
2.1. Test Equipment

The following test equipment are used during the conducted emission test:

Item	Instrument	Manufacturer	Type No./Serial No	Last Cal.	Remark
1	Test Receiver	R & S	ESCS 30/825442/17	May, 2009	
2	L.I.S.N.	R & S	ESH3-Z5/825016/6	May, 2009	EUT
3	L.I.S.N.	Kyoritsu	KNW-407/8-1420-3	May, 2009	Peripherals
4	Pulse Limiter	R & S	ESH3-Z2	May, 2009	
5	No.1 Shielded Room			N/A	

Note: All instruments are calibrated every one year.

2.2. Test Setup



2.3. Limits

FCC Part 15 Subpart C Paragraph 15.207 (dBuV) Limit		
Frequency MHz	Limits	
	QP	AVG
0.15 - 0.50	66-56	56-46
0.50-5.0	56	46
5.0 - 30	60	50

2.4. Test Procedure

The EUT and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50 ohm /50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm /50uH coupling impedance with 50ohm termination. (Please refers to the block diagram of the test setup and photographs.)

Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.4: 2003 on conducted measurement.

Conducted emissions were invested over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9kHz.

2.5. Uncertainty

± 2.26 dB

2.6. Test Result of Conducted Emission

Product : Wireless Gateway
 Test Item : Conducted Emission Test
 Power Line : Line 1
 Test Mode : Mode 1: Transmitter (Zigbee) (2445MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV	Margin dB	Limit dBuV
Line 1					
Quasi-Peak					
0.154	9.760	42.220	51.981	-13.905	65.886
0.173	9.734	41.520	51.255	-14.088	65.343
0.209	9.701	38.950	48.651	-15.663	64.314
0.248	9.677	33.930	43.607	-19.593	63.200
0.298	9.650	30.710	40.360	-21.411	61.771
0.357	9.650	23.180	32.830	-27.256	60.086
Average					
0.154	9.760	18.610	28.371	-27.515	55.886
0.173	9.734	24.730	34.465	-20.878	55.343
0.209	9.701	23.530	33.231	-21.083	54.314
0.248	9.677	17.980	27.657	-25.543	53.200
0.298	9.650	15.210	24.860	-26.911	51.771
0.357	9.650	3.870	13.520	-36.566	50.086

Note:

1. All Reading Levels are Quasi-Peak and average value.
2. "■" means the worst emission level.
3. Measurement Level = Reading Level + Correct Factor

Product : Wireless Gateway
 Test Item : Conducted Emission Test
 Power Line : Line 2
 Test Mode : Mode 1: Transmitter (Zigbee) (2445MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV	Margin dB	Limit dBuV
Line 2					
Quasi-Peak					
0.162	9.751	40.050	49.801	-15.856	65.657
0.197	9.719	35.320	45.039	-19.618	64.657
0.252	9.685	34.960	44.645	-18.441	63.086
0.291	9.663	30.840	40.503	-21.468	61.971
0.341	9.659	25.960	35.619	-24.924	60.543
0.384	9.650	21.760	31.410	-27.904	59.314
Average					
0.162	9.751	22.490	32.241	-23.416	55.657
0.197	9.719	12.370	22.089	-32.568	54.657
0.252	9.685	20.770	30.455	-22.631	53.086
0.291	9.663	15.280	24.943	-27.028	51.971
0.341	9.659	10.800	20.459	-30.084	50.543
0.384	9.650	7.370	17.020	-32.294	49.314

Note:

1. All Reading Levels are Quasi-Peak and average value.
2. "■" means the worst emission level.
3. Measurement Level = Reading Level + Correct Factor

3. Peak Power Output

3.1. Test Equipment

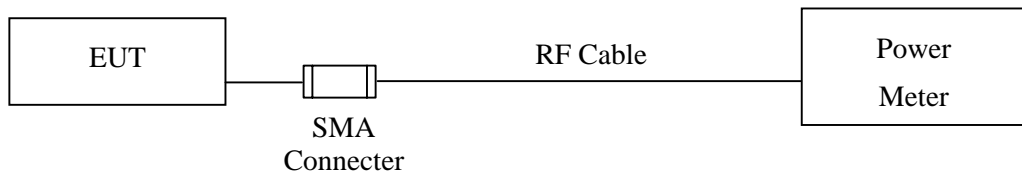
The following test equipments are used during the radiated emission tests:

Equipment	Manufacturer	Model No./Serial No.	Last Cal.
X Power Meter	Anritsu	ML2495A/6K00003357	May, 2009
X Power Sensor	Anritsu	MA2491A/034457	May, 2009

Note: 1. All instruments are calibrated every one year.
 2. The test instruments marked by “X” are used to measure the final test results.

3.2. Test Setup

Conducted Measurement



3.3. Limits

The maximum peak power shall be less 1 Watt.

3.4. Test Procedure

The EUT was tested according to DTS test procedure of Mar. 2005 KDB558074 for compliance to FCC 47CFR 15.247 requirements.

3.5. Uncertainty

± 1.27 dB

3.6. Test Result of Peak Power Output

Product : Wireless Gateway
 Test Item : Peak Power Output Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter (Zigbee)

Cable Loss=0.5dB		Peak Power Output	
Channel No.	Frequency (MHz)	Output Power Value (dBm)	Required Limit
1	2405.00	14.95	1Watt= 30 dBm
9	2445.00	15.94	1Watt= 30 dBm
16	2480.00	-8.85	1Watt= 30 dBm

Note: Peak Power Output Value =Reading value on peak power meter + cable loss

4. Radiated Emission

4.1. Test Equipment

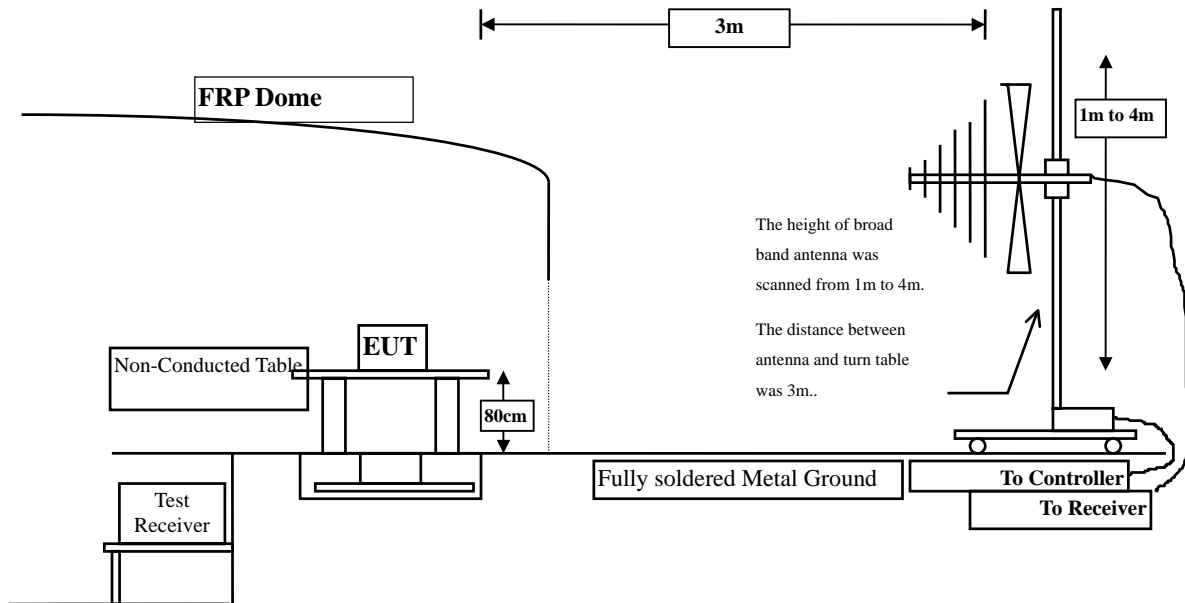
The following test equipment are used during the radiated emission test:

Test Site		Equipment	Manufacturer	Model No./Serial No.	Last Cal.
☒ Site # 3	X	Bilog Antenna	Schaffner Chase	CBL6112B/2673	Sep., 2008
	X	Horn Antenna	Schwarzbeck	BBHA9120D/D305	Sep., 2008
	X	Horn Antenna	Schwarzbeck	BBHA9170/208	Jul., 2008
	X	Pre-Amplifier	AGILENT	8447D/2944A09549	Sep., 2008
	X	Test Receiver	R & S	ESCS 30/ 825442/018	Sep., 2008
	X	Spectrum Analyzer	Advantest	R3162/91700283	Oct., 2008
	X	Coaxial Cable	Quietek	QTK-CABLE/ CAB5	Feb., 2009
	X	Controller	Quietek	QTK-CONTROLLER/ CTRL3	N/A
	X	Coaxial Switch	Anritsu	MP59B/6200265729	N/A

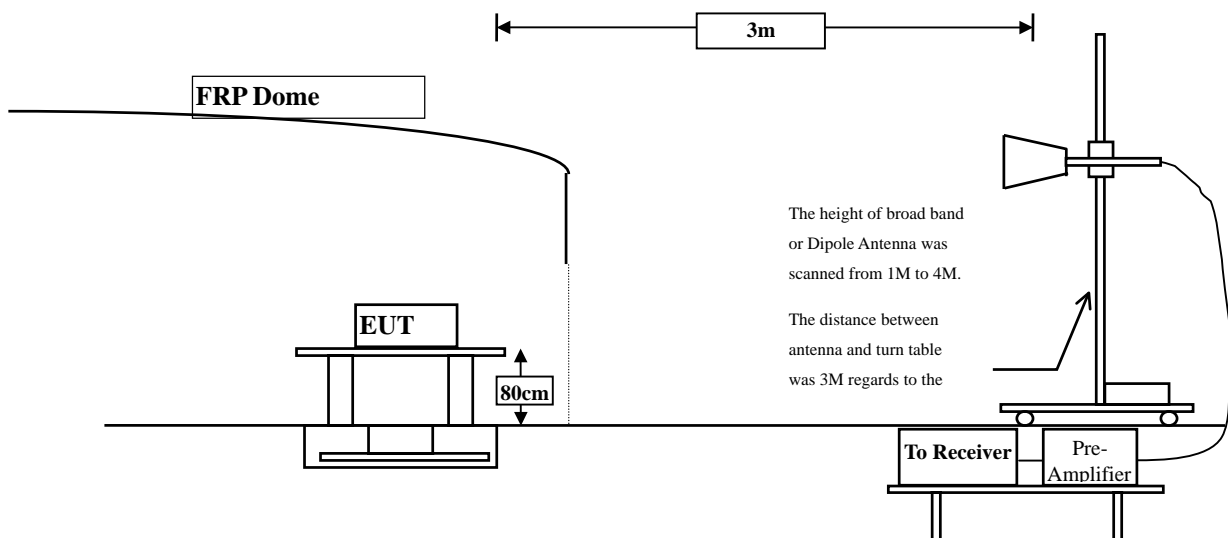
- Note:
1. All equipments are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.
 2. The test instruments marked with "X" are used to measure the final test results.

4.2. Test Setup

Radiated Emission Below 1GHz



Radiated Emission Above 1GHz



4.3. Limits

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 20dB below the level of the fundamental or to the general radiated emission limits in paragraph 15.209, whichever is the lesser attenuation.

FCC Part 15 Subpart C Paragraph 15.209(a) Limits		
Frequency MHz	uV/m @3m	dBuV/m@3m
30-88	100	40
88-216	150	43.5
216-960	200	46
Above 960	500	54

Remarks: E field strength (dBuV/m) = 20 log E field strength (uV/m)

4.4. Test Procedure

The EUT was setup according to ANSI C63.4, 2003 and tested according to DTS test procedure of Mar. 2005 KDB558074 for compliance to FCC 47CFR 15.247 requirements.

The EUT is placed on a turn table which is 0.8 meter above ground. The turn table is rotated 360 degrees to determine the position of the maximum emission level. The EUT was positioned such that the distance from antenna to the EUT was 3 meters.

The antenna is scanned between 1 meter and 4 meters to find out the maximum emission level. This is repeated for both horizontal and vertical polarization of the antenna. In order to find the maximum emission, all of the interface cables were manipulated according to ANSI C63.4:2003 on radiated measurement.

The resolution bandwidth below 1GHz setting on the field strength meter is 120 kHz and above 1GHz is 1MHz.

Radiated emission measurements below 1GHz are made using broadband Bilog antenna and above 1GHz are made using Horn Antennas.

The measurement is divided into the Preliminary Measurement and the Final Measurement.

The suspected frequencies are searched for in Preliminary Measurement with the measurement antenna kept pointed at the source of the emission both in azimuth and elevation, with the polarization of the antenna oriented for maximum response. The antenna is pointed at an angle towards the source of the emission, and the EUT is rotated in both height and polarization to maximize the measured emission. The emission is kept within the illumination area of the 3 dB bandwidth of the antenna.

The worst radiated emission is measured in the Open Area Test Site on the Final Measurement.

The measurement frequency range from 30MHz - 10th Harmonic of fundamental was investigated.

4.5. Uncertainty

± 3.9 dB above 1GHz

± 3.8 dB below 1GHz

4.6. Test Result of Radiated Emission

Product : Wireless Gateway
 Test Item : Harmonic Radiated Emission Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter (Zigbee) (2405MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
Horizontal					
Peak Detector:					
4810.000	9.606	46.470	56.076	-17.924	74.000
7215.000	14.334	41.730	56.064	-17.936	74.000
9620.000	19.705	35.970	55.675	-18.325	74.000
Average Detector:					
4810.000	9.606	35.180	44.786	-9.214	54.000
7215.000	14.334	28.740	43.074	-10.926	54.000
9620.000	19.705	22.610	42.315	-11.685	54.000
Vertical					
Peak Detector:					
4810.000	8.345	56.010	64.355	-9.645	74.000
7215.000	15.422	47.660	63.082	-10.918	74.000
9620.000	18.914	38.530	57.444	-16.556	74.000
Average Detector:					
4810.000	8.345	44.340	52.685	-1.315	54.000
7215.000	15.422	34.480	49.902	-4.098	54.000
9620.000	18.914	26.190	45.104	-8.896	54.000

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. “*”, means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : Wireless Gateway
 Test Item : Harmonic Radiated Emission Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter (Zigbee) (2445 MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
Horizontal					
Peak Detector:					
4890.000	9.513	40.510	50.023	-23.977	74.000
7335.000	14.627	38.080	52.707	-21.293	74.000
9780.000	20.073	36.320	56.393	-17.607	74.000
Average Detector:					
9780.000	20.073	22.100	42.173	-11.827	54.000
Vertical					
Peak Detector:					
4890.000	9.087	49.320	58.407	-15.593	74.000
7335.000	15.282	42.720	58.002	-15.998	74.000
9780.000	19.279	37.930	57.209	-16.791	74.000
Average Detector:					
4890.000	9.087	36.740	45.827	-8.173	54.000
7335.000	15.282	30.520	45.802	-8.198	54.000
9780.000	19.279	25.640	44.919	-9.081	54.000

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. “ * ”, means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : Wireless Gateway
 Test Item : Harmonic Radiated Emission Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter (Zigbee) (2480 MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
Horizontal					
Peak Detector:					
4960.000	9.413	46.434	55.847	-18.153	74.000
7440.000	15.016	40.665	55.681	-18.319	74.000
9920.000	19.752	35.665	55.417	-18.583	74.000
Average Detector:					
4960.000	9.413	35.239	44.652	-9.348	54.000
7440.000	15.016	28.001	43.017	-10.983	54.000
9920.000	19.752	22.469	42.221	-11.779	54.000
Vertical					
Peak Detector:					
4960.000	9.716	53.832	63.548	-10.452	74.000
7440.000	15.390	47.628	63.018	-10.982	74.000
9920.000	18.897	38.143	57.040	-16.960	74.000
Average Detector:					
4960.000	9.716	41.532	51.248	-2.752	54.000
7440.000	15.390	34.434	49.824	-4.176	54.000
9920.000	18.897	25.403	44.300	-9.700	54.000

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. “ * ”, means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : Wireless Gateway
 Test Item : General Radiated Emission Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter (Zigbee)(2445 MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
Horizontal					
295.780	-4.148	46.163	42.015	-3.985	46.000
383.080	-1.799	44.637	42.838	-3.162	46.000
431.580	-2.561	46.545	43.984	-2.016	46.000
480.080	-0.784	43.979	43.195	-2.805	46.000
577.080	2.641	32.849	35.490	-10.510	46.000
672.140	1.840	32.285	34.125	-11.875	46.000
Vertical					
288.020	-8.716	35.474	26.758	-19.242	46.000
431.580	-9.971	31.396	21.425	-24.575	46.000
480.080	-4.814	28.332	23.518	-22.482	46.000
604.240	-2.256	24.648	22.393	-23.607	46.000
757.500	2.417	21.078	23.495	-22.505	46.000
934.040	5.296	26.736	32.032	-13.968	46.000

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. “ * ”, means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection.

5. RF antenna conducted test

5.1. Test Equipment

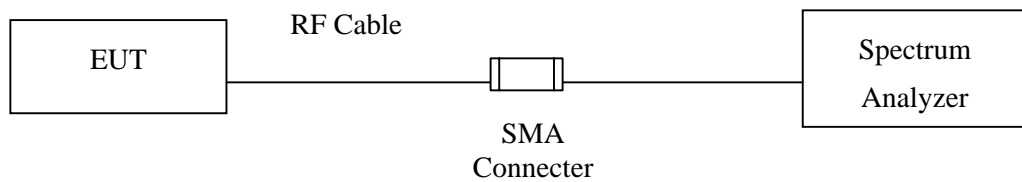
The following test equipments are used during the radiated emission tests:

	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
	Spectrum Analyzer	R&S	FSP40 / 100170	Nov, 2008
	Spectrum Analyzer	Agilent	E4407B / US39440758	May, 2009
X	Spectrum Analyzer	Agilent	N9010A / MY48030495	Apr., 2009

- Note:
1. All equipments are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.
 2. The test instruments marked with “X” are used to measure the final test results.

5.2. Test Setup

RF antenna Conducted Measurement:



5.3. Limits

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).

5.4. Test Procedure

The EUT was tested according to DTS test procedure of Mar. 2005 KDB558074 for compliance to FCC 47CFR 15.247 requirements.

Set RBW = 100 kHz, Set VBW > RBW, scan up through 10th harmonic.

5.5. Uncertainty

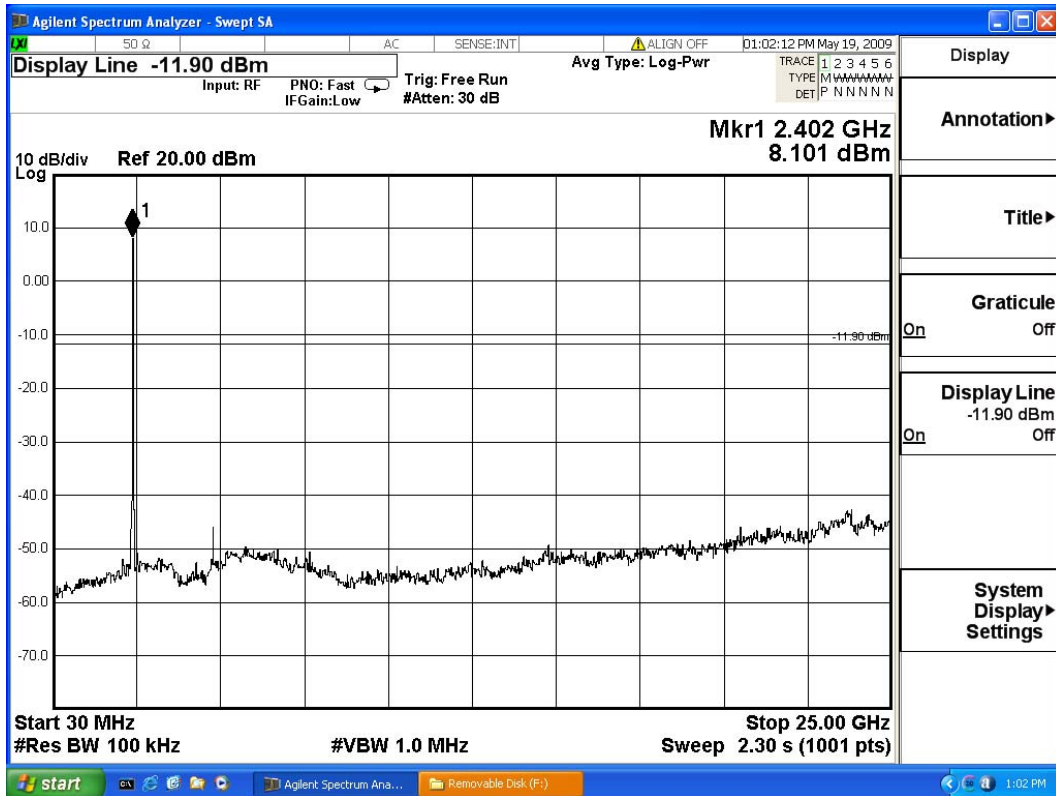
The measurement uncertainty

Conducted is defined as $\pm 1.27\text{dB}$

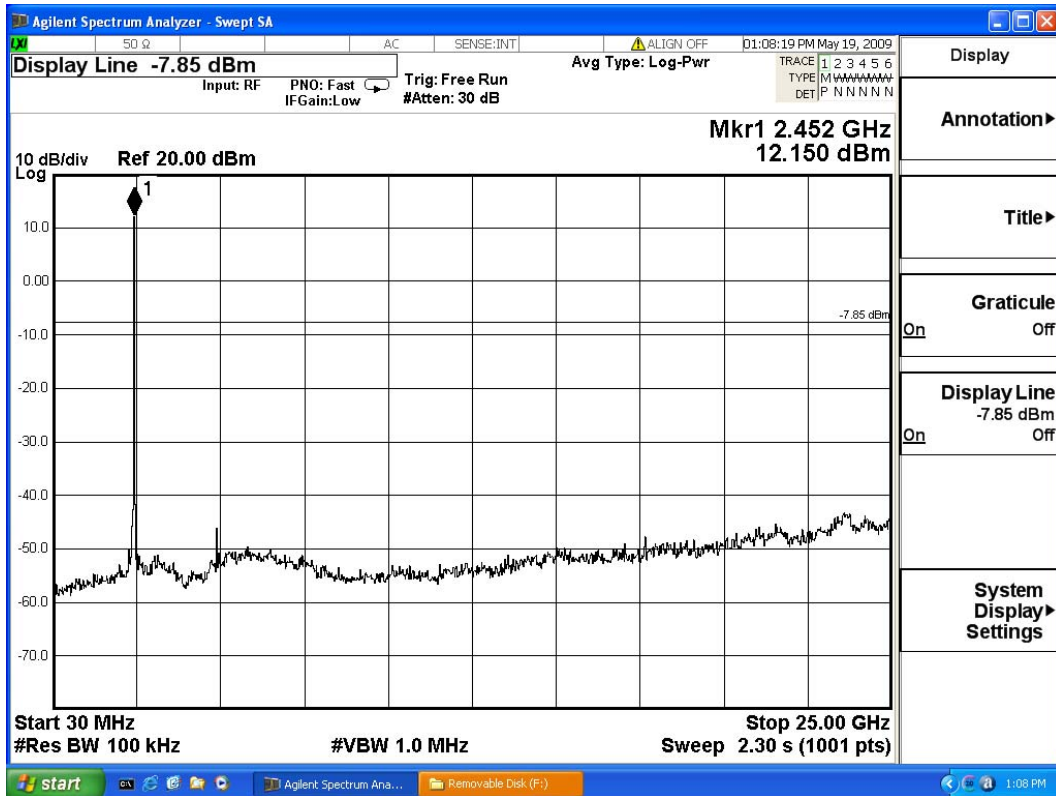
5.6. Test Result of RF antenna conducted test

Product : Wireless Gateway
 Test Item : RF antenna conducted test
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter (Zigbee)

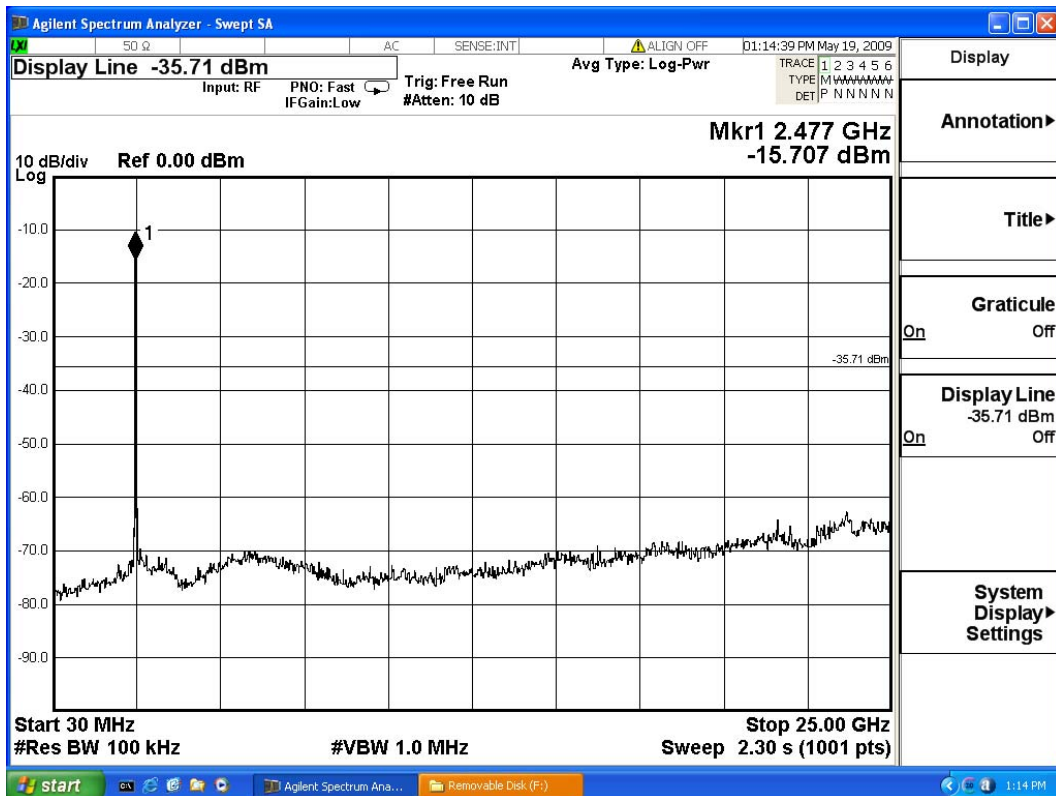
Channel 01 (2405MHz) 30-25GHz



Channel 09 (2445MHz) 30-25GHz



Channel 16 (2480MHz) 30-25GHz



6. Band Edge

6.1. Test Equipment

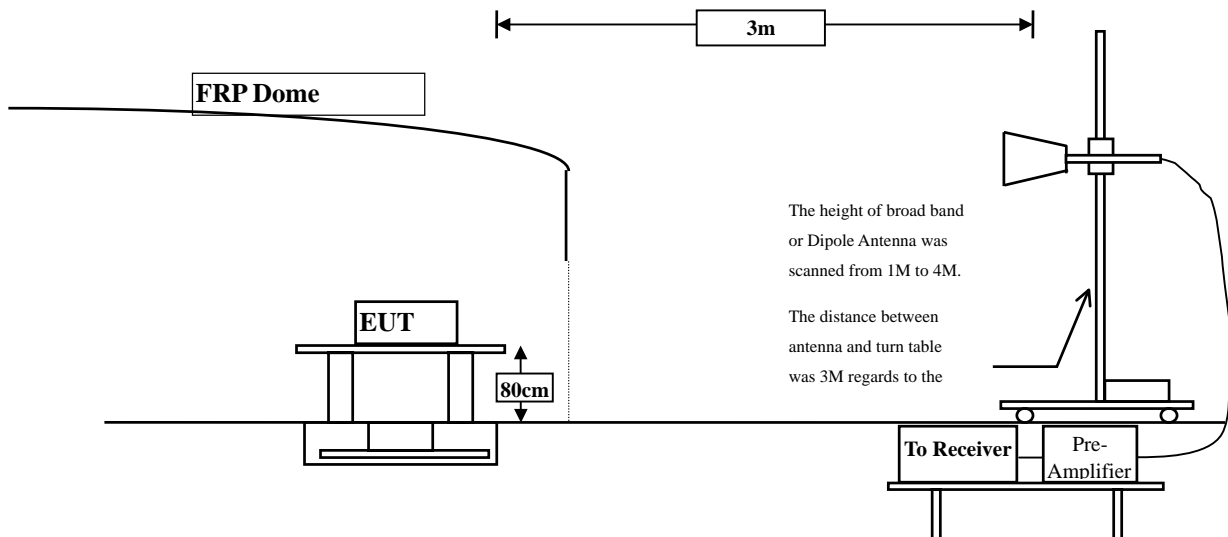
The following test equipments are used during the band edge tests:

Test Site	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
☒ Site # 3	X Bilog Antenna	Schaffner Chase	CBL6112B/2673	Sep., 2008
	X Pre-Amplifier	AGILENT	8447D/2944A09549	Sep., 2008
	X Test Receiver	R & S	ESCS 30/ 825442/018	Sep., 2008
	X Spectrum Analyzer	Advantest	R3162/91700283	Oct., 2008
	X Coaxial Cable	Quietek	QTK-CABLE/ CAB5	Feb., 2009
	X Controller	Quietek	QTK-CONTROLLER/ CTRL3	N/A
	X Coaxial Switch	Anritsu	MP59B/6200265729	N/A

- Note:
1. All instruments are calibrated every one year.
 2. The test instruments marked by “X” are used to measure the final test results.

6.2. Test Setup

RF Radiated Measurement:



6.3. Limits

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 20dB below the level of the fundamental or to the general radiated emission limits in paragraph 15.209, whichever is the lesser attenuation.

6.4. Test Procedure

The EUT was setup according to ANSI C63.4, 2003 and tested according to DTS test procedure of Mar. 2005 KDB558074 for compliance to FCC 47CFR 15.247 requirements.

The EUT is placed on a turn table which is 0.8 meter above ground. The turn table is rotated 360 degrees to determine the position of the maximum emission level. The EUT was positioned such that the distance from antenna to the EUT was 3 meters.

The antenna is scanned from 1 meter to 4 meters to find out the maximum emission level. This is repeated for both horizontal and vertical polarization of the antenna. In order to find the maximum emission, all of the interface cables were manipulated according to ANSI C63.4:2003 on radiated measurement.

6.5. Uncertainty

± 3.9 dB above 1GHz

± 3.8 dB below 1GHz

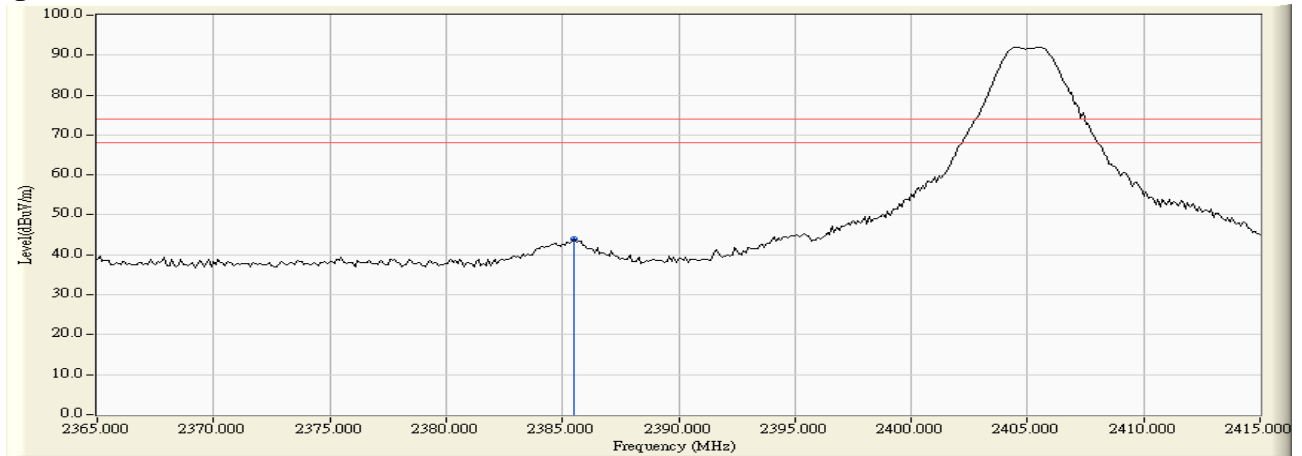
6.6. Test Result of Band Edge

Product : Wireless Gateway
 Test Item : Band Edge Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter (Zigbee)

RF Radiated Measurement (Horizontal):

Channel No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Emission Level (dBuV/m)	Peak Limit (dBuV/m)	Average Limit (dBuV/m)	Result
01 (Peak)	2385.500	0.995	42.843	43.838	74.00	54.00	Pass
01 (Average)	--	--	--	--	74.00	54.00	Pass

Figure Channel 01: Horizontal (Peak)



Note:

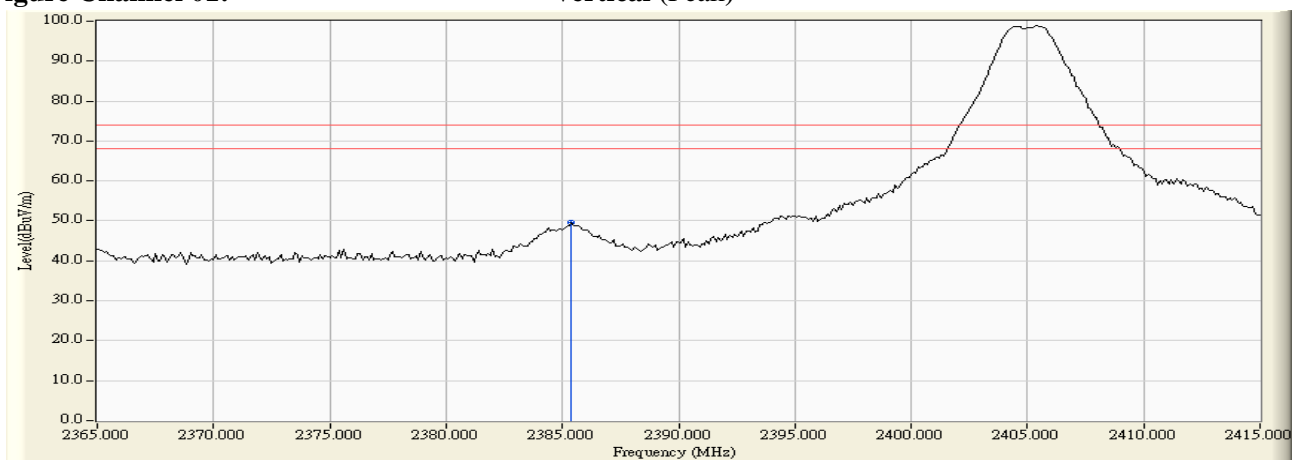
1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. “ * ”, means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection.

Product : Wireless Gateway
 Test Item : Band Edge Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter (Zigbee)

RF Radiated Measurement (Vertical):

Channel No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Emission Level (dBuV/m)	Peak Limit (dBuV/m)	Average Limit (dBuV/m)	Result
01 (Peak)	2385.400	2.502	47.019	49.521	74.00	54.00	Pass
01 (Average)	--	--	--	--	74.00	54.00	Pass

Figure Channel 01: Vertical (Peak)



Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. “ * ”, means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection.

Product : Wireless Gateway
 Test Item : Band Edge Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter (Zigbee)

RF Radiated Measurement (Horizontal):

Channel No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Emission Level (dBuV/m)	Peak Limit (dBuV/m)	Average Limit (dBuV/m)	Result
16 (Peak)	2483.500	3.076	50.969	54.045	74.00	54.00	Pass
16(Average)	2483.500	3.076	39.580	42.656	74.00	54.00	Pass

Figure Channel 16: Horizontal (Peak)

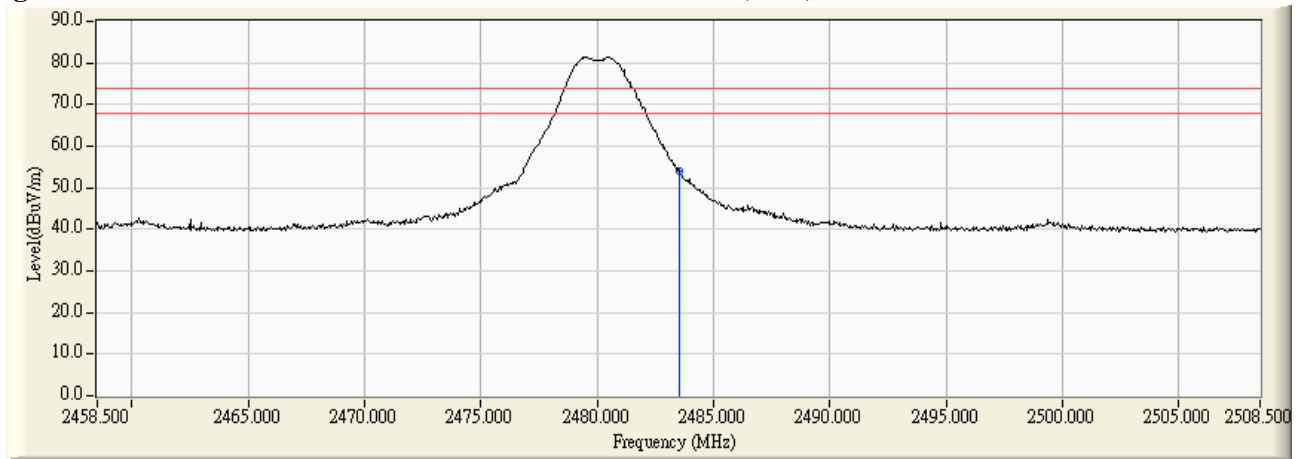
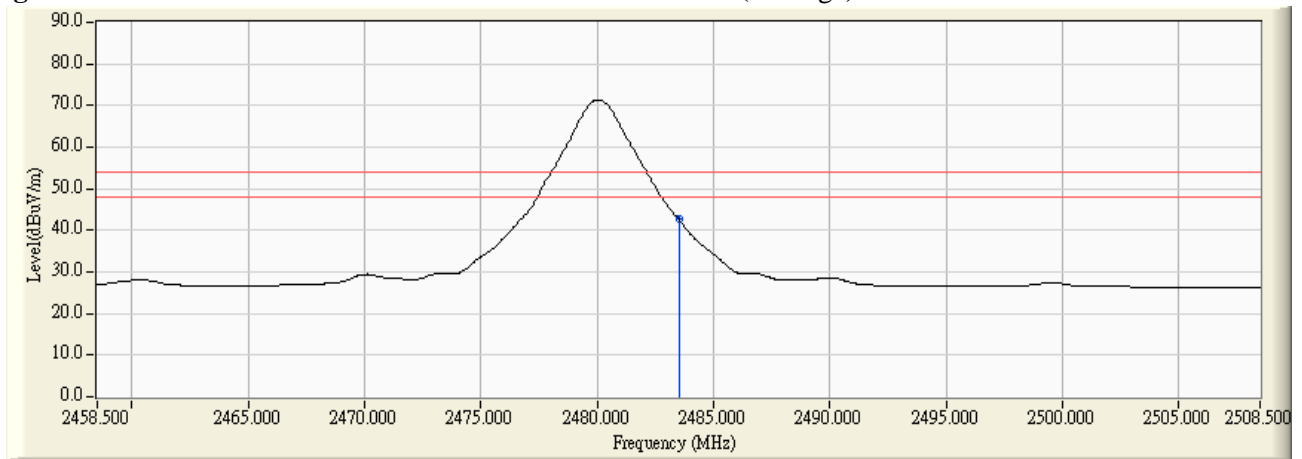


Figure Channel 16: Horizontal (Average)



Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. “ * ”, means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection.

Product : Wireless Gateway
 Test Item : Band Edge Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter (Zigbee)

RF Radiated Measurement (Vertical):

Channel No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Emission Level (dBuV/m)	Peak Limit (dBuV/m)	Average Limit (dBuV/m)	Result
16 (Peak)	2483.500	2.552	60.835	63.387	74.00	54.00	Pass
16 (Average)	2483.500	2.552	48.767	51.319	74.00	54.00	Pass

Figure Channel 16: Vertical (Peak)

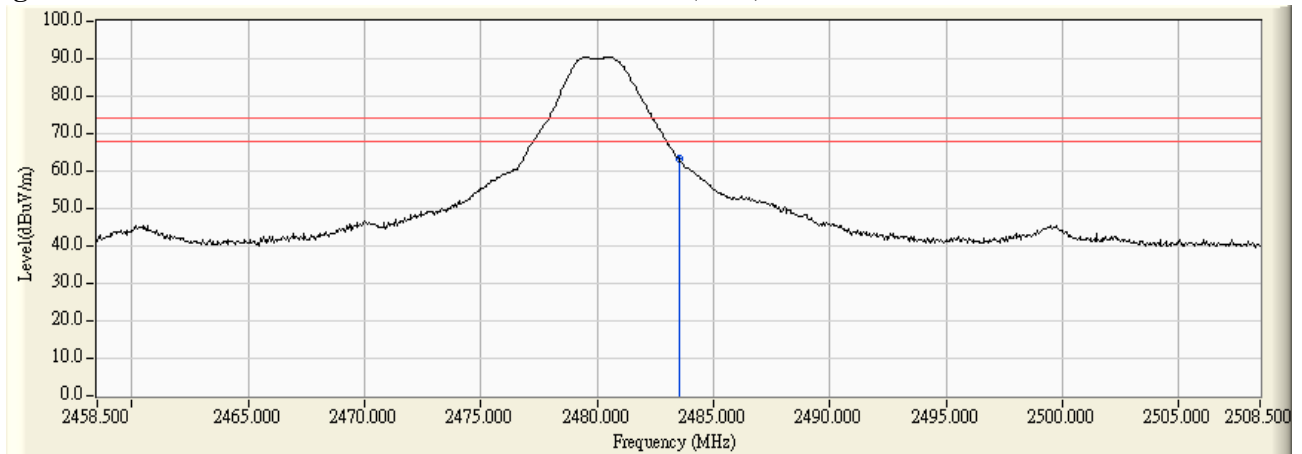
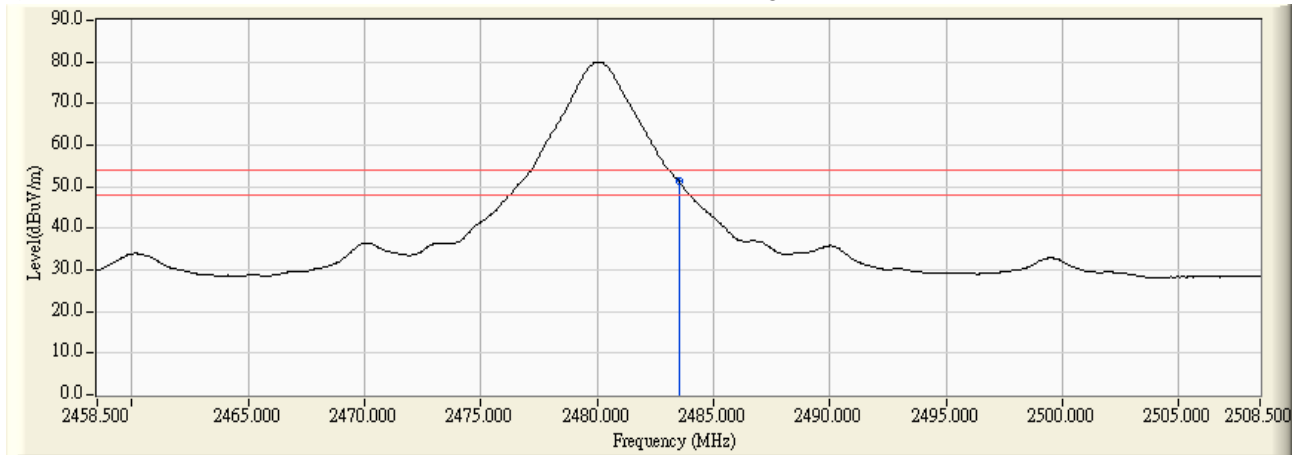


Figure Channel 16: Vertical (Average)



Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. “ * ”, means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection.

7. Occupied Bandwidth

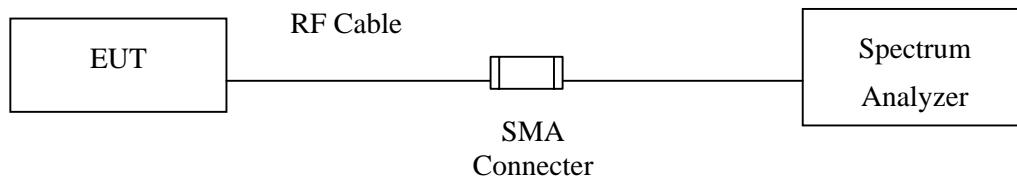
7.1. Test Equipment

The following test equipments are used during the radiated emission tests:

Equipment	Manufacturer	Model No./Serial No.	Last Cal.
Spectrum Analyzer	R&S	FSP40 / 100170	Nov, 2008
Spectrum Analyzer	Agilent	E4407B / US39440758	May, 2009
X Spectrum Analyzer	Agilent	N9010A / MY48030495	Apr., 2009

Note: 1. All instruments are calibrated every one year.
 2. The test instruments marked by “X” are used to measure the final test results.

7.2. Test Setup



7.3. Limits

The minimum bandwidth shall be at least 500 kHz.

7.4. Test Procedure

The EUT was setup according to ANSI C63.4, 2003; tested according to DTS test procedure of Mar. 2005 KDB558074 for compliance to FCC 47CFR 15.247 requirements.

Set RBW = 100 kHz, Span greater than RBW.

7.5. Uncertainty

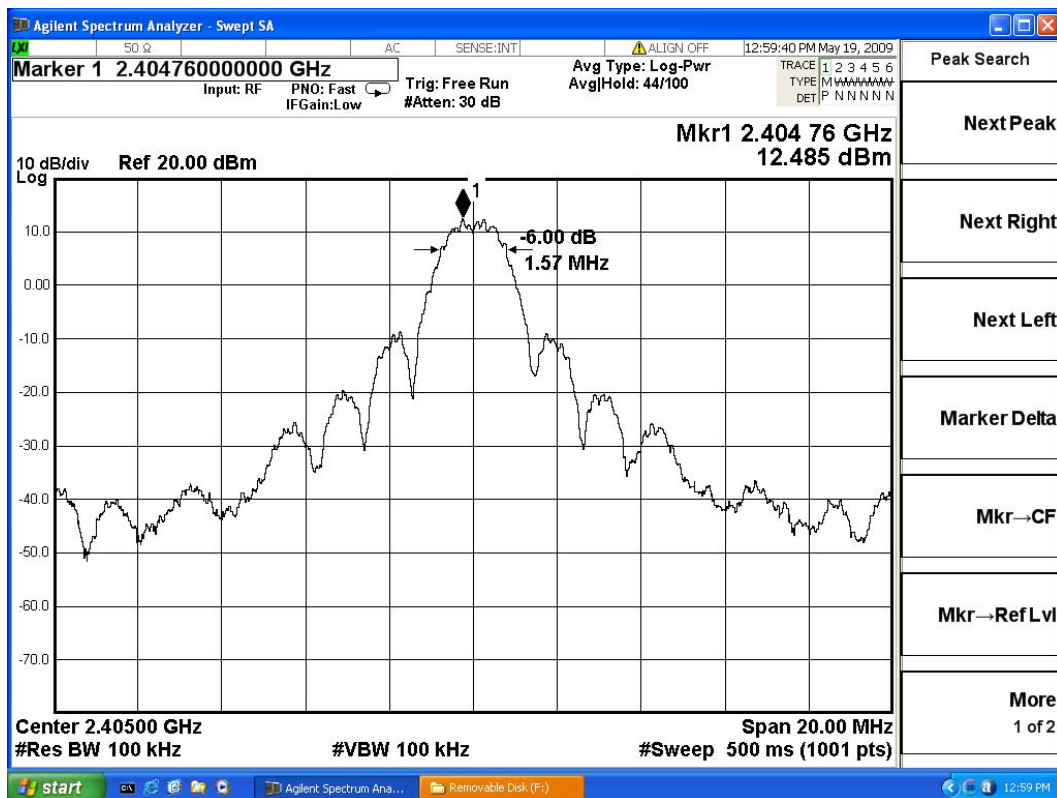
± 150Hz

7.6. Test Result of Occupied Bandwidth

Product : Wireless Gateway
 Test Item : Occupied Bandwidth Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter (Zigbee) (2405MHz)

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
1	2405.00	1570	>500	Pass

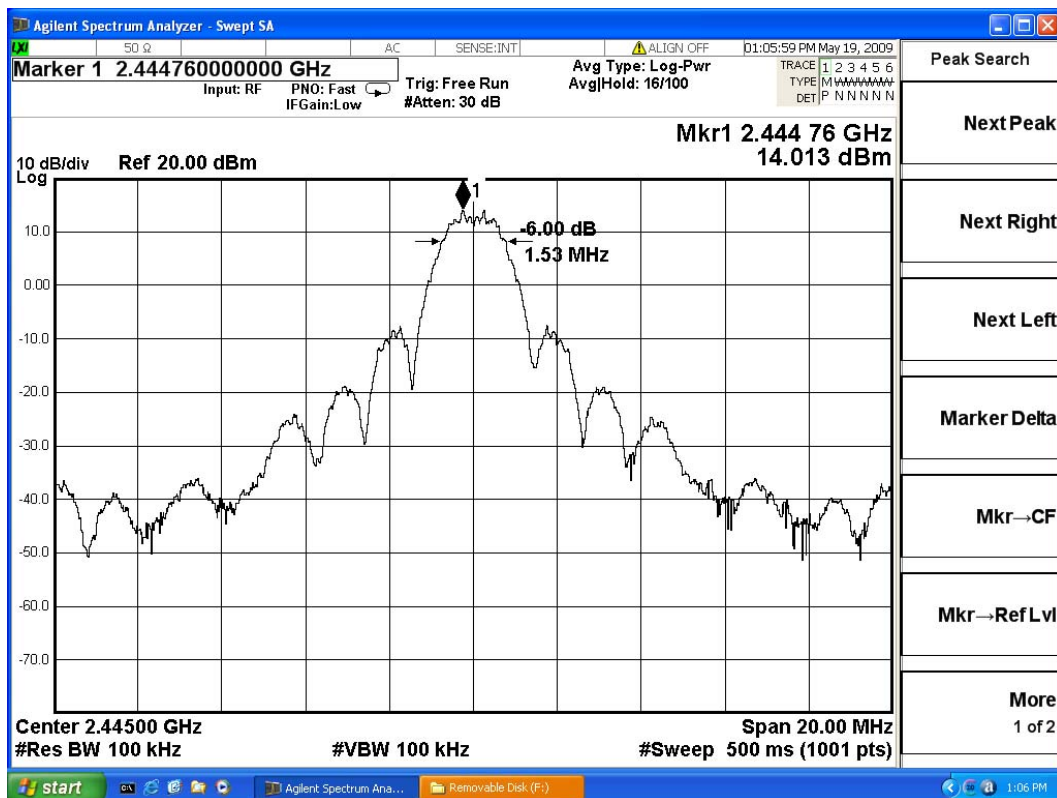
Figure Channel 1:



Product : Wireless Gateway
 Test Item : Occupied Bandwidth Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter (Zigbee) (2445MHz)

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
9	2445.00	1530	>500	Pass

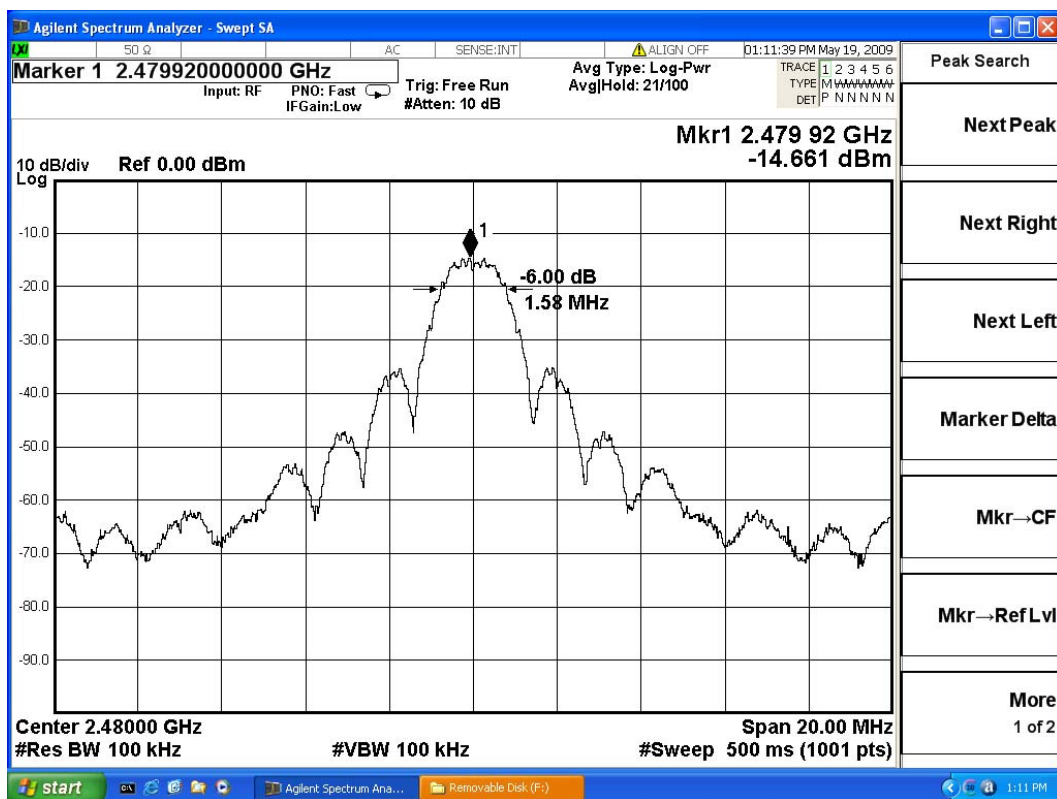
Figure Channel 9:



Product : Wireless Gateway
 Test Item : Occupied Bandwidth Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter (Zigbee) (2480MHz)

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
16	2480.00	1580	>500	Pass

Figure Channel 16:



8. Power Density

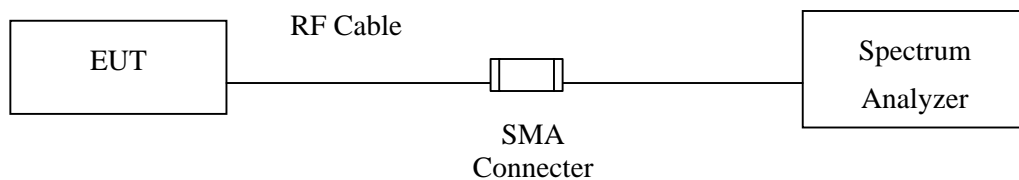
8.1. Test Equipment

The following test equipments are used during the radiated emission tests:

Equipment	Manufacturer	Model No./Serial No.	Last Cal.
Spectrum Analyzer	R&S	FSP40 / 100170	Nov, 2008
Spectrum Analyzer	Agilent	E4407B / US39440758	May, 2009
X Spectrum Analyzer	Agilent	N9010A / MY48030495	Apr., 2009

Note: 1. All equipments are calibrated every one year.
 2. The test instruments marked by “X” are used to measure the final test results.

8.2. Test Setup



8.3. Limits

The transmitted power density averaged over any 1 second interval shall not be greater +8dBm in any 3kHz bandwidth.

8.4. Test Procedure

The EUT was setup according to ANSI C63.4, 2003; tested according to DTS test procedure of Mar. 2005 KDB558074 for compliance to FCC 47CFR 15.247 requirements.
 Set RBW= 3 kHz, VBW=10KHz, Sweep time=(SPAN/3KHz), detector=Peak detector

8.5. Uncertainty

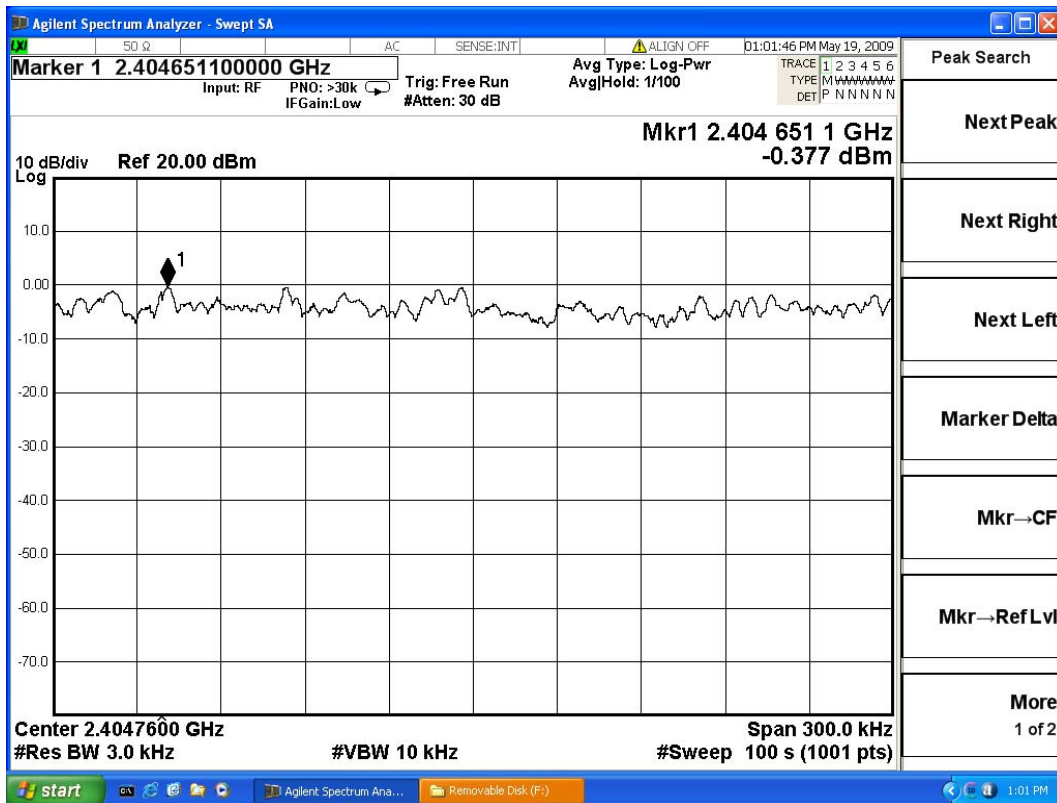
± 1.27 dB

8.6. Test Result of Power Density

Product : Wireless Gateway
 Test Item : Power Density Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter (Zigbee) (2405MHz)

Channel No.	Frequency (MHz)	Measure Level (dBm)	Limit (dBm)	Result
1	2405.00	-0.377	< 8dBm	Pass

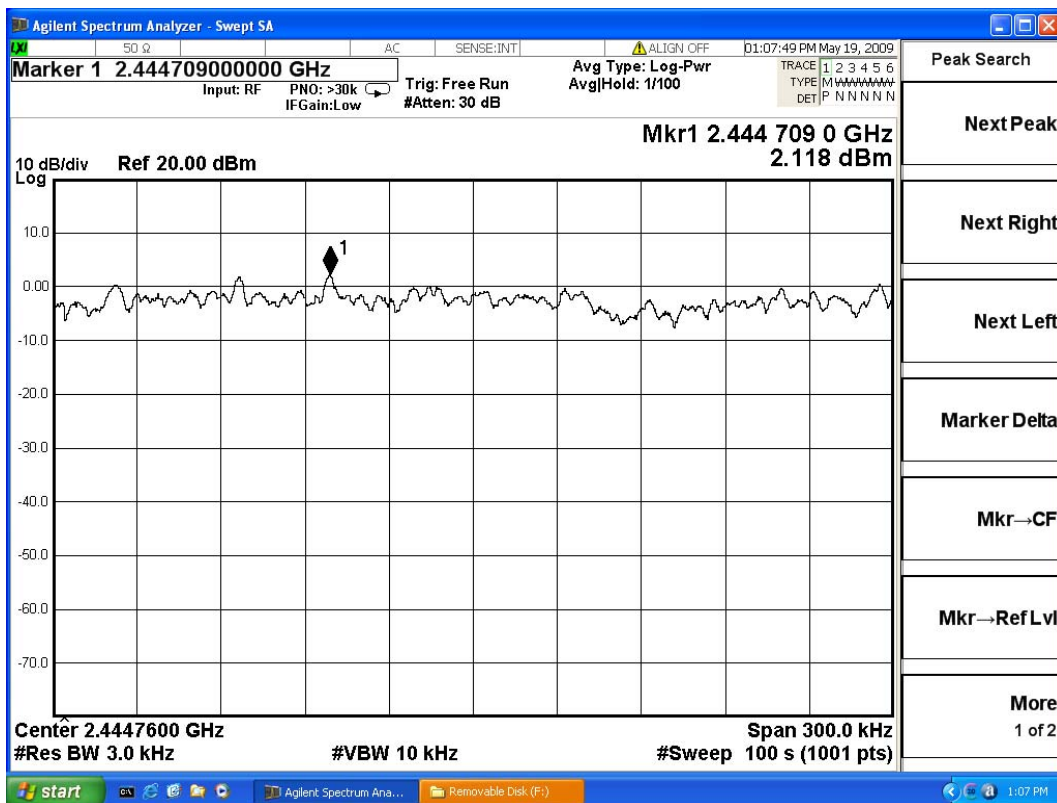
Figure Channel 1:



Product : Wireless Gateway
 Test Item : Power Density Data
 Test Site : No.3OATS
 Test Mode : Mode 1: Transmitter (Zigbee) (2445MHz)

Channel No.	Frequency (MHz)	Measurement Level (dBm)	Required Limit (dBm)	Result
9	2445.000	2.118	< 8dBm	Pass

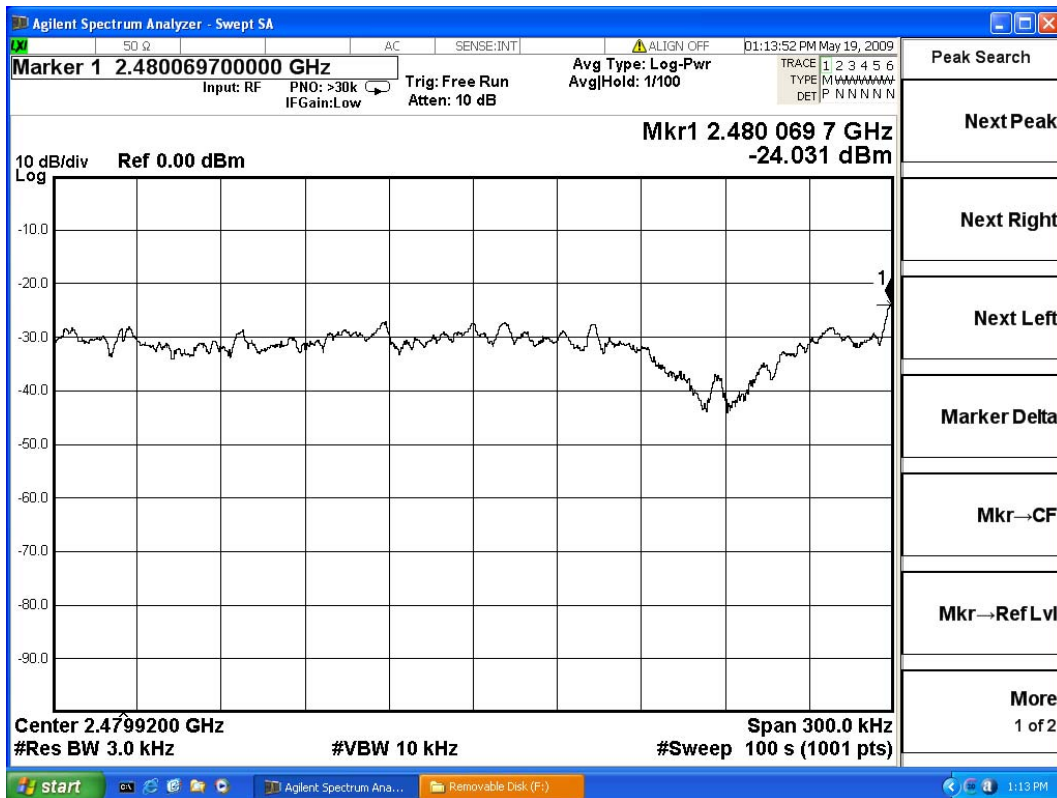
Figure Channel 9:



Product : Wireless Gateway
 Test Item : Power Density Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter (Zigbee) (2480MHz)

Channel No.	Frequency (MHz)	Measurement Level (dBm)	Required Limit (dBm)	Result
16	2480.00	-24.031	< 8dBm	Pass

Figure Channel 16:



9. EMI Reduction Method During Compliance Testing

No modification was made during testing.